## II. Remarks

Claims 1, 3 through 8, 11 through 15, 18 through 22 and 24 through 26 are pending in the application. Claims 2, 4, 5, 9 through 12, 16, 17, 19, 20 and 23 have been cancelled. Claims 1, 8 and 15 have been amended.

### Rejections Under 35 USC § 103

Claims 1, 3, 5 through 8, 12 through 14 and 24 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,595,338 issued to Bansbach et al. in view of U.S. Patent No. 5,611,407 issued to Maehara et al.

Bansbach teaches a friction clutch with a hydraulic actuator utilized in a transfer case. A hydraulic pressure generator having a motor and ball screw assembly is attached to the outside of a transfer case and the friction clutch pack is disposed within the transfer case, about the primary output shaft. The friction clutch pack is actuated by one or a plurality of pistons also disposed about the primary output shaft which are acted upon by the pressurized fluid provided by the ball screw assembly.

By way of contrast, Applicants' device is a compact assembly having input and output members, annular slave piston and a friction clutch pack disposed about a first axis and a bi-directional electric motor, a gear train and a ball screw assembly disposed along axes normal to the first axis. The device also includes a wrap spring anti-backdrive assembly and a pressure sensor that cooperates with a microprocessor. The resulting package is compact and provides improved operation over the prior art.



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Chicago, IL 60611-5599

Independent claims 1 and 8 have been revised to specifically recite that the device includes both the hydraulic pressure sensor and a microprocessor which receives a signal from the pressure sensor. Bansbach et al. thus neither teach nor suggest the anti-backdrive mechanism, the hydraulic pressure sensor or a microprocessor having an input for receiving a signal from the pressure sensor. Bansbach et al. does teach a controller (42) which receives signals from vehicle sensors (44) but, in column 3, states that input signals from one or more vehicle sensors 44 "are indicative of various operational characteristics of the vehicle." No disclosure or suggestion of sensors which indicate operational characteristics of the hydraulically actuated friction clutch pack are present.

Maehara et al. are relied upon by the Examiner to cure the defects of Bansbach et al. It is respectfully submitted that Maehara et al. achieve no such cure. Maehara et al. teach a driving force distribution system for a four-wheel drive vehicle which includes an electrically controlled motor having output rotation which is transformed into the stroke of a plunger which, in turn, generates hydraulic pressure to engage a clutch. The specific teaching of Maehara et al. relied upon, in Figures 12a and 12b, is the means (3100) for inhibiting back driving of the electric motor (2200). The Examiner relies upon this teaching of Maehara et al. to support his obviousness rejection:

> It would have been obvious to provide a means for inhibiting back driving of the motor 92 in Bansbach et al., as taught by Maehara et al., the motivation being to make it unnecessary to constantly apply pressure to maintain clutch engagement.

As noted previously, this statement is inconsistent with the operation of these devices. Hydraulic pressure must always be maintained if a certain clutch



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engagement is to be maintained. However, with anti-backdriving devices, it may not be necessary to apply electric power to the motor to maintain clutch engagement.

Inspection of Maehara et al. reveals the reason for its teaching of an anti-backdriving device. Figure 12a includes two compression springs (unlabeled) concentrically disposed within the cylinder device (2300). A third compression spring (also unlabeled) resides within the hydraulic pressure chamber (2376). All three springs act to return the piston and lead screw to a retracted or unpressurized position. Thus within the hydraulic pressure supply device (2100), and not even considering the action or forces generated by the driven clutch device, three springs are utilized to drive the pressure generating mechanism to a retracted or unpressurized state. The anti-backdrive mechanism is therefore necessary to resist this motion. Without this feature, the unit itself would return to an unpressurized and thus clutch disengaged state. No such return springs reside in Applicants' device and thus Maehara et al. effectively and essentially teach away from Applicants' device by presenting the combination of return springs and anti-backdrive assemblies as a necessary combination.

Because Maehara et al. teach away from Applicant's device, any argument that it provides the motivation to include an anti-backdrive mechanism in Applicants' device, which does not include return springs, is unsupportable and specious. Moreover, and as noted above, the amendments to claims 1 and 8 relating to the inclusion of a pressure sensor and a microprocessor which receives signals therefrom clearly distinguish over the Bansbach et al. and Maehara et al. references in a manner consistent with 37 U.S.C. § 103 and are patentable and allowable.



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Claims 4 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bansbach et al. in view of Maehara et al. as applied to claims 1, 3, 5 through 8 and 12 through 14 above, and further in view of U.S. Patent Publication No. 2002/0162328 A1 of Shaw et al. (Shaw).

Bansbach et al. and Maehara et al. have been discussed and distinguished above and such text is hereby incorporated by reference. Shaw et al. teach an apparatus and method for actuating and controlling a transfer case clutch. Two distinct embodiments are disclosed. In Figures 1 and 3, a system which appears to utilize pressurized hydraulic fluid from the braking system of the vehicle is taught. In Figure 2, a motor drive having a single pinion and spur gear and a lead screw which translates a piston are taught. Shaw is relied upon by the Examiner for its teaching of an electric motor-actuated master cylinder/slave cylinder arranged wherein a pressure sensor 174 is provided to sense pressure in the output line to the slave cylinder. The Examiner then asserts that:

> It would have been obvious to carry this teaching to Bansbach et al., as modified in view of Maehara et al. providing a pressure sensor therein for the purpose of protecting the system from over pressure.

As noted previously, this statement appears wide of the mark as nothing in either Applicants' disclosure or Shaw discusses over pressure protection. Moreover, Shaw teaches nothing about the nature of the "control device 176" except that it "operates to control functions of system 100 through a connection to motor 145." Even if it did, the purpose or function of the sensor is not at issue in an apparatus claim. Shaw et al. does not cure the defects of Bansbach et al. and Maehara et al.



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In any event, claims 4 and 11 have been cancelled and their limitations incorporated into independent claims 1 and 8, respectively.

Claims 15, 18, 20 through 22 and 26 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bansbach et al. in view of Maehara et al. as applied to claims 1, 3, 5 through 8 and 12 through 14 above, and further in view of Takeyama.

Bansbach et al. and Maehara et al. have been discussed and distinguished above. Takeyama teaches an electric drive having a bi-directional electric motor and gear train driving a lead screw and piston. The patent is apparently relied upon for its teaching of a gear train having multiple gears and pinion whereas Bansbach utilizes a single gear and pinion reduction and Maehara et al. utilize none. That is, it is a direct drive.

While the Examiner chooses to see these references, particularly Takeyama, as representing possible choices which achieve a particular speed reduction, the Examiner ignores all the attendant and related differences of the associated drive systems. Bansbach et al. utilize a direct single pinion and gear train with no anti-backdrive assembly. Maehara et al. utilize a plurality of compression springs, direct drive and, not surprisingly, an anti-backdrive device. Takeyama teaches a multiple gear and pinion drive train with no anti-backdrive device. As a fourth variation, Applicant's assembly teaches a multiple gear and pinion drive train and an anti-backdrive device.

The most logical reading of the cited references is that a multiple gear speed reduction assembly eliminates the need for an anti-backdrive device. Conversely, direct drive supports the need for an anti-backdrive device. Breaking with this



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Chicago, IL 60611-5599

pattern is Applicants' claimed device which utilizes both a multiple gear and pinion gear train and an anti-backdrive device. The only argument asserting that Applicant's configuration is obvious is that proffered by the Examiner, apparently on the basis of hindsight and a rejection comprising a careful selection and assembly of components from three references.

Independent claim 15 has been further revised to include limitations regarding the pressure sensor and microprocessor which receives its signal and controls the electric motor. In view of the foregoing arguments and revisions to claim 15, it is submitted that claims 15, 18, 20 through 22 and 26 are not obvious under a proper interpretation of 35 U.S.C. §103(a), over Bansbach et al., Maehara et al. and Takeyama.

Claim 19 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bansbach et al. in view of Maehara et al. and Takeyama as applied to claims 15, 18 and 20 through 22 above, and further in view of Shaw et al. This combination of references has been discussed and distinguished above. Moreover, Claim 19 has been cancelled and thus its rejection has been rendered moot.



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## SUMMARY

Pending Claims 1, 3, 6 through 8, 13 through 15, 18, 21, 22 and 24 through 26 as amended are patentable. Applicants respectfully request the Examiner grant allowance of these claims. The Examiner is invited to contact the undersigned attorneys for the Applicants via telephone if such communication would expedite this application.

Respectfully submitted,

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Date

David D. Murray (Reg. No. 28,647)
Attorney for Applicants



BRINKS HOFER GILSON & LIONE
PO Box 10395
Chicago, IL 60611-5599